



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,596	03/11/2004	Akira Fukuda	042184	3909
38834	7590	11/29/2005		
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			EXAMINER ALEMU, EPHREM	
			ART UNIT 2821	PAPER NUMBER

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/797,596

Applicant(s)

FUKUDA ET AL.

Examiner

Ephrem Alemu

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-8, 14-16, 21, 22, 27 and 28 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5, 9, 10, 13, 17-20 and 23-26 is/are rejected.
- 7) ☒ Claim(s) 3, 4, 11 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings were received on 9-15-05. These drawings are accepted.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Hatakeyama et al. (US 5,883,470).

Re claim 1, Hatakeyama discloses a beam source (Figs. 2, 3) comprising:

a plasma generating chamber (i.e., discharge tube 21) (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-34);

a first electrode (i.e., downstream electrode 30, 36) disposed in the plasma generating chamber (i.e., discharge tube 21) (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-34);

an antenna (i.e., excitation coil 25) disposed so as to face the first electrode (i.e., downstream electrode 30) for generating plasma in the plasma generating chamber (i.e., discharge tube 21) (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-34);

a second electrode (i.e., upstream electrode 29, 35) disposed in the plasma generating chamber (i.e., discharge tube 21) so as to face the first electrode (i.e., downstream electrode 30, 36) (Fig. 3; Col. 4, lines 12-31; Col. 5, lines 2-34); and

Art Unit: 2821

a power supply (32) for applying a voltage between the first electrode (i.e., downstream electrode 30) and the second electrode (i.e., upstream electrode 29, 35) to extract ions from the plasma generated by the antenna (i.e., excitation coil 25) (Figs. 2, 3; Col. 4, lines 25-31; Col. 5, lines 2-5 & 38-40).

Re claim 2, Hatakeyama further discloses the antenna (i.e., excitation coil 25) is disposed outside of the plasma generating chamber (i.e., discharge tube 21), wherein the second electrode (i.e., upstream electrode 35) is disposed inwardly of the antenna (Fig. 3; Col. 5, lines 2-34).

Re claim 5, Hatakeyama further discloses the first electrode (i.e., downstream electrode 30, 36) comprises an orifice plate having a plurality of orifices (i.e., openings) for neutralizing the ions extracted from the plasma (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-53).

4. Claims 1, 9, 17-20 and 23-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhang et al. (US 6,291,357).

Re claims 1 and 9, Zhang discloses a beam source (Fig. 6) comprising:

a plasma generating chamber (110) (Fig. 6; Col. 7, lines 18-36);

a stage (i.e., support 120) for supporting a workpiece (i.e., substrate 20) (Fig. 6; Col. 7, lines 18-35);

a first electrode (i.e., second electrode 215) disposed in the plasma generating chamber (110) (Fig. 6; Col. 7, lines 18-36);

an antenna (190) disposed so as to face the first electrode (110) for generating plasma in the plasma generating chamber (110) (Fig. 6; Col. 7, line 54- Col. 8, line 19);

Art Unit: 2821

a second electrode (i.e., first electrode 210) disposed in the plasma generating chamber (110) so as to face the first electrode (i.e., second electrode 215) (Fig. 6; Col. 7, line 54- Col. 8, line 19); and

a power supply (230) for applying a voltage between the first electrode (i.e., second electrode 215) and the second electrode (i.e., first electrode 210) to extract ions from the plasma generated by the antenna (190) (Fig. 6; Col. 8, lines 39-44).

Re claims 17, 18, 20, 23, 24 and 26, Zhang further discloses the antenna comprises at least one elongated and/or looped conductive material having a hooked shape or an arcuate shape (i.e., an inner antenna 190) (Fig. 6; Col. 8, lines 39-44).

Re claims 19 and 25, Zhang further discloses the antenna (190) includes a conductive material (i.e., coil 195) and an insulation member (i.e., silicon) covering said conductive material.(i.e., coil 195) (Fig. 6; Col. 8, lines 39-44).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9-10 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakeyama et al. (US 5,883,470) in view of Fig. 1 of applicants' admitted prior art (AAPA).

Re claim 9, Hatakeyama discloses a beam source (Figs. 2, 3) comprising:

a plasma generating chamber (i.e., discharge tube 21) (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-34);

Art Unit: 2821

a first electrode (i.e., downstream electrode 30, 36) disposed in the plasma generating chamber (i.e., discharge tube 21) (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-34);

an antenna (i.e., excitation coil 25) disposed so as to face the first electrode (i.e., downstream electrode 30) for generating plasma in the plasma generating chamber (i.e., discharge tube 21) (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-34);

a second electrode (i.e., upstream electrode 29, 35) disposed in the plasma generating chamber (i.e., discharge tube 21) so as to face the first electrode (i.e., downstream electrode 30, 36) (Fig. 3; Col. 4, lines 12-31; Col. 5, lines 2-34); and

a power supply (32) for applying a voltage between the first electrode (i.e., downstream electrode 30) and the second electrode (i.e., upstream electrode 29, 35) to extract ions from the plasma generated by the antenna (i.e., excitation coil 25) (Figs. 2, 3; Col. 4, lines 25-31; Col. 5, lines 2-5 & 38-40).

Hatakeyama does not show a beam processing apparatus comprising: a stage for supporting a workpiece. However, Fig. 1 of AAPA shows a beam processing apparatus including a stage for supporting workpiece X for the purpose of supporting the workpiece during fabrication. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a beam processing apparatus including a workpiece support as taught in Fig. 1 of AAPA for the beam source of Hatakeyama for no other reason than providing a support to the workpiece during fabrication using Hatakeyama's beam source.

Re claim 10, Hatakeyama further discloses the antenna (i.e., excitation coil 25) is disposed outside of the plasma generating chamber (i.e., discharge tube 21), wherein the second

Art Unit: 2821

electrode (i.e., upstream electrode 35) is disposed inwardly of the antenna (Fig. 3; Col. 5, lines 2-34).

Re claim 13, Hatakeyama further discloses the first electrode (i.e., downstream electrode 30, 36) comprises an orifice plate having a plurality of orifices (i.e., openings) for neutralizing the ions extracted from the plasma (Figs. 2, 3; Col. 4, lines 12-31; Col. 5, lines 2-53).

***Allowable Subject Matter***

7. Claims 6-8, 14-16, 21, 22, 27 and 28 are allowed

8. Claims 3, 4, 11 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fail to teach or suggest, alone or in combination, the following limitations:

“wherein the antenna has a spiral shape, wherein the second electrode has a spiral shape positioned between adjacent spiral lines of the spiral shape of the antenna” as claimed in claims 3 and 11; and “wherein the antenna comprises a plurality of divided antennas, wherein the second electrode comprises a plurality of divided second electrodes positioned between adjacent divided antennas” as claimed in claims 4 and 12; and “a second electrode disposed between the antenna and the first electrode in the plasma generating chamber, the second electrode having a ring shape so as to surround the plasma generating chamber” as claimed in claims 6 and 14. It is for this reason in combination with all the other limitations in the independent claims 6 and 14, that claims 6-8, 14-16, 21, 22, 27 and 28 are allowable over prior art of record.

***Response to Arguments***

10. Applicant's arguments, see pages 13-14, filed 9/15/05, with respect to claims 6 and 14 have been fully considered and are persuasive. The rejection of claims 6-8 and 14-16 have been withdrawn.

11. Applicant's arguments filed 9/15/05, with respect to claim 1 have been fully considered but they are not persuasive.

In response to applicants' argument that Hatakeyama fail to disclose "or fairly suggest the feature of claim 1 concerning the antenna being disposed so as to face the first electrode for generating plasma in said plasma generating chamber is respectfully disagreed. Although Hatakeyama antenna is disposed around the beam generation chamber, Figs. 2 and 3 clearly shows the antenna (i.e., excitation coil 25) disposed so as to face the first electrode (i.e., downstream electrode 30) for generating plasma in the plasma generating chamber (i.e., discharge tube 21). The limitation "so as to face" is so broadly cited it does not preclude such arrangement as disclosed by Hatakeyama. Thus, the rejection with respect to claim 1 is proper.

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Collins et al. (US 6,814,814) and Chen (US 6,512,333); also teach similar inventive subject matter.

13. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



Art Unit: 2821

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### *Correspondence*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ephrem Alemu whose telephone number is (571) 272-1818. The examiner can normally be reached on M-F Flex hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don K. Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EA  
6-10-05



**TUYET VO**  
**PRIMARY EXAMINER**